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Interactive television reception and transmitting processes and associated devices

The invention relates to an interactive television system. It is more particularly applicable to the cases where the television reception system is connected to a domestic digital network. It is therefore
5 concerned in particular with a system comprising means of interactive digital television transmission and user stations or terminals for reception of interactive digital television.

The invention applies equally to a standardized
10 interactive digital television system (Multimedia Home Platform or MHP standard, for example) as to a proprietary system (such as that implemented by the OpenTV company for example).

15 Devices are known in the art which make provision for the recording, by means of decoders, of interactive programmes. The latter subsequently enable a user to interact, during the viewing of an application. For example, the document WO-01/50763 discloses the automatic
20 recording of an auxiliary programme according to preset criteria, with a view to subsequent use by the user. Document WO-00/76213 relates to a prior recording of a software application, then of a television programme corresponding to the moment of its broadcasting, with
25 appropriate markings for the interactivity relating to this application and the option for the user to trigger the interactive programme.

In interactive digital television systems, the broadcaster provides the terminal with a digital stream.
30 This stream contains multiplexed data which make it possible to reconstruct the initial streams: for example

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video streams, audio streams, signalling data and
interactive application.

For reasons of broadcasting cost and of
downloading time, the broadcasters and providers of
5 services tend to minimize the size of the applications.
An effect of this is the non-existence of applications
that contain additional content such as real-time video
sequences enhancing broadcast programmes. Now, the use of
these sequences may be very beneficial for the production
10 of interactive adverts for example.

The prior downloading to the terminal of
sophisticated applications can be envisaged, and may make
it possible for data which it would be impractical, or
even impossible, to download with the stream broadcast
15 upon the triggering of an application to be made
available locally. However, such an approach requires a
coherent system that executes in a rather complex way,
since it is necessary to organize a prior downloading of
the applications into all the receivers concerned. In
20 practice, receivers that have been unable to download the
applications in the requisite time cannot benefit from
the associated interactive services. Now, several factors
might compromise the local availability of these
applications: insufficient storage space, overly
25 restricted bandwidth, failed prior connection to a
network (for example the Internet) for downloading, etc.

Document EP-0989743 discloses a method of
transmitting application data in a digital transport
30 stream, these data relating to several services. An
application data table, also transmitted, contains
information about the applications transported in each
service. This table enables in particular a decoder to
decide whether or not to maintain applications when
35 switching from one service to another (§ [0148]), or

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whether download applications not yet present in the
decoder but required by a new service (§ [0121]).

Prior document WO-01/31920 describes a technique
for managing multiple applications in a digital network,
5   according to which a virtual application table ("VAT"
table) is communicated to terminals. The latter are
moreover furnished with authorization levels fixed by a
multiapplications manager. On the basis of this
information, each terminal is capable of constructing a
10 local VAT table, which indicates those applications that
the terminal must be furnished with, by downloading
(p.28, l.3-27).

These latter two embodiments necessitate table
tracking, management and utilization, which entails a
15 relatively high level of complexity.

International application WO-00/64172 teaches a
method for performing or otherwise a predefined action in
a receiver, for example for selecting the display of
20 information, as a function of the contents of triggers
received by this receiver. This display is different
depending on whether a predefined rule does or does not
apply to the triggers received.

This technique requires that the management of
25 the triggers be precisely coordinated with the chosen
display schemes.

Patent US-2002/0059623 discloses a file system
with dual mode in a television of a subscriber network.
30 This system is designed to use local data when they are
available and remote data (by downloading) in the
converse case. The data required for services can be
obtained beforehand by the receivers and be stored
locally in the form of data relating to hyperlinks
35 (§ [0107]). Upon the execution of a corresponding

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service, a local application verifies the presence of
these data in local memory and proposes to the user the
execution of an improved version of the service using the
hyperlinks (§ [0109]).

5   Patent US-5 966 120 describes a method for
combining and distributing data with a pre-formatted
real-time video. In a receiver, an augmented video
programme is created by inserting selected portions of
auxiliary data into a selected primary video programme.
10   These auxiliary data may be stored beforehand in the
receiver, so as to be utilized subsequently at the
requisite time.

        Prior document WO-02/32139 relates to systems and
methods for providing media content on demand, for
15   example on-demand video or audio content, or electronic
publications. An interactive television furnished with
appropriate means can retrieve further content
corresponding to such selected media content, either at
the same time as the latter is despatched, or by prior
20   downloading (p.42, 1.31-33). In the latter case, the
interactive television is capable of also retrieving
information associating the further content with the
media content (p.43, 1.9-14). The mode of display of the
further content with respect to the media content may
25   optionally be chosen by the user (p.45, 1.4-7).

        The potentialities of these latter three
techniques remain restricted in practice to the
displaying of small supplementary fields on the screen,
added to the displaying of the base service, or to the
30   introduction of sequences such as short advertising
inserts.

        The present invention relates to interactive
television and transmitting processes (notably
35   broadcasting) enabling the execution of sophisticated

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applications, while considerably reducing the risks of
nontriggering of the applications.

The processes of the invention may be implemented
in a reliable manner, without needing excessive
5 resources.

The invention also relates to devices associated
with these processes and offering the same advantages:
interactive television receiver, digital television
terminal and programme transmitting station, as well as
10 corresponding computer programs.

The invention therefore relates to an interactive
television process applicable to a system where at least
one or more transmitting stations transmit programmes to
15 receivers. This process comprises:

(a)   reception in one of the receivers, of a
startup application and of a normal application and
triggering of the startup application causing execution
of steps b) to d) hereinbelow;

20   (b)   testing for the presence in a memory of
the said receiver of at least one file of additional
data;

(c)   in the absence of this file or of these
files of additional data in the memory, starting up of
25 the normal application;

(d)   if the file or files of additional data
are present in the memory, starting up of an improved
application using these files of additional data.

30   The expression "interactive television" is
understood to mean a television allowing either
interactivity between the broadcasting station and the
receivers, by virtue of a return path, or local
interactivity at the level of the receivers or of
35 terminals downstream, or both:

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The term "application" designates moreover a
functional assembly designed to be executed at the level
of receivers and/or of terminals downstream, in
interaction with a user, preferably in a format rendering
5 it suitable for being broadcast over a network. This
functional assembly can in particular include content, in
particular of audio and/or video type, software
instructions and/or description pages (for example HTML
or MHEG).

10   The distinction between startup normal and
improved applications is of a functional nature, each of
these applications fulfilling a specific role. However,
in practice, they may be merged into functionalities of
one and the same application, a kernel of which is
15 designed for startup, and provided with modules
dynamically linked to the kernel so as to allow normal or
improved operations.. Hybrid embodiments with two
applications instead of one or of three may also be
beneficial (an application for startup and normal
20 operations or an application for startup and improved
operations).

Further, several improved applications may also
be provided likewise, that are respectively associated to
25 the presence or the absence of several addional data
files.

Surprisingly, the process of the invention makes
two distinct applications, offering variable levels of
30 information, available simultaneously to the receivers.
It is at the receiver level, as a function of the data
available in memory, that the choice is made between
these two applications. This approach contrasts with the
known methods, which provide for complete unavailability
35 of an application in the case where the receiver is not

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able to execute it, and which are for this reason centred
around the adaptation of the execution capabilities of
the terminals. It may offer great flexibility of
implementation and of execution.

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By way of illustration, the interactive
television process is implemented in respect of an
automobile advert. In the version associated with the
normal application, photos of cars for sale are shown
10 statically on the screen, while superimposing, in display
windows, information relating to the features of the
vehicles for sale (screen mixing text and light
graphics).
On the other hand, in the version associated with
15 the improved application, the television viewer is
presented with video sequences with inlaid buttons, which
make it possible to navigate from one sequence to
another. A menu bar at the bottom of the screen makes it
possible to change stream so as to view and/or hear
20 recounted, specific features of the car.

More generally, the improved application
advantageously expresses as video and/or sound sequences,
elements expressed in a textual manner by the normal
25 application.

The transmission of the programmes from the
transmitting stations to the receivers is preferably done
through broadcasting.
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The receivers can consist of user terminals, or
optionally of pooled or networked systems, able to make
information in memory available for a plurality of
terminals. In the latter case, the startup test and its

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side branches are implemented at the level of these systems, upstream of the terminals.

In a first form of use of the startup
5 application, the latter executes steps b) to d) itself. The test and selection instructions for the application to be started up are therefore controlled directly by the broadcasting station. In a second form of use of the startup application, the test and selection instructions
10 are implemented locally, at the level of the receivers. The startup application then only has a role of triggering these functionalities. The implementation of these latter in a receiver may be performed by initial downloading (via the Internet or via a general
15 broadcast), or by direct installation in the receiver of an appropriate module.

Preferably, it is possible to "force" startup of the normal application, even when the files of additional
20 data are available locally. Thus, a user can in certain cases avoid possible problems of slowdowns or of display (overloaded memory, required version of the plugware or plug-in not available, etc.), by using just the elementary version of the application.
25

The process of the invention advantageously comprises the following prior steps, the transmitting station comprising at least one link for bilateral communication with the receivers:
30   e) reception of a message proposing loading of the files of additional data into the receiver;
        f) acceptance or refusal by a user of the receiver, of the proposed loading;
        g) in case of refusal, exiting from the present
35 process;

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h) in case of acceptance, automatic downloading of
the files of additional data which are usable
subsequently by the startup application (A2) into the
receiver, via the bilateral communication link;
5   i) recording in the said memory of the said
receiver, of the files of additional data.

One of the objects of the invention may thus be
to provide the user with the possibility of accepting or
of refusing the loading of data possibly of various types
10 (software, video and/or audio streams, pictures,
alphanumeric information) and in this way to offer him
several levels of payback of the application, depending
on the presence of otherwise of these additional data.

15   In another advantageous form of downloading of
the files of additional data, the return path is not used
and the user interacts locally with the receiver to
indicate that he wishes to obtain an improved version of
the application. The receiver then automatically obtains
20 the files of additional data from information
communicated by the transmitting station with the loading
proposal message. For example, the download is performed
via the Internet, by broadcasting in a specific stream,
or by a broadband stream via a DSL network.
25

In yet another form of downloading of the files
of additional data, the user downloads them spontaneously
from a communications network, such as for example the
Internet. He then needs to be informed sufficiently in
30 advance of the availability of the information and of
their location (for example by means of a programme
guide, or of a transmitted advert).

Before step f), there is advantageously provision
35 for the reception, by the receiver, of at least one cue

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regarding the contents of the files of additional data,
this cue or cues preferably being chosen from among a
size, a subsequent date of use, a date of expiry or of
validity of the additional data, a date on which the
5 additional data will be used, a broadcasting channel
which will use the additional data, and a downloading
address.

Before step h), there is advantageously provision
for the user to indicate a choice of immediate
10 downloading or of deferred downloading of the files of
additional data.

It is also beneficial during step e), for the
reception of the proposal message to be effected upon the
reception of an application of the same type as the
15 improved application.

According to a variant embodiment, the files of
additional data contain the improved application.
Alternatively, there is provision, during step a), for
the user to also receive the improved application.

20   Moreover, the process of the invention preferably
comprises a step of automatic erasing of the contents of
the memory. It is also possible to provide for an
automatic erasure system. A date of erasure is then
advantageously associated with the files of additional
25 data and the erasure step comprises a periodic operation
of reading this date and an erasure operation when this
date is reached. In another form of erasure of the
contents of the memory, this erasure step is triggered by
the user or by a command remotely controlled from the
30 broadcasting station for example.

It should be noted that the files of additional
data may equally well contain one or more pieces of
software, video data, pictures, sound or a combination of
these types of data.

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Moreover, the invention advantageously implements
an interactive television process applicable to a system
where at least one transmitting station comprises at
least one bilateral communication link to receivers. This
5   process comprises the following steps:
        a) sending of a message proposing loading of at
least one file of additional data by a transmitting
station to the receivers, with a view to an optional
improvement of an application intended to be executed
10 subsequently;
        b) and upon acceptance by a user of one of the
receivers, of the proposal message loading proposal,
transmission to this receiver of the files of additional
data.
15

This process, which is especially appropriate for
the execution of the process defined above, preferably
complies with the latter's schemes.

20   There is advantageously provision for the
reception by a return path of an acceptance message
originating from the user terminal, then the transferring
of the additional data by this return path.

25   The invention applies also to an interactive
television receiver comprising means for testing for the
presence in a memory of the said receiver, of at least
one file of additional data.
        According to the invention, this receiver also
30 comprises:
        - means of reception of a startup application and
of a normal application,
        - and means of starting up the normal application
in the absence of the files of additional data in the

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said memory and of starting up an improved application if
the files of additional data are present in the memory.

This receiver is preferably designed to implement
an interactive television process in accordance with any
5 one of the forms of the invention. It is preferably
furnished with a memory module capable of recording the
files of additional data.

The subject of the invention is also a digital
10 television terminal, characterized in that it comprises
an interactive television receiver according to the
invention.

Moreover, the invention applies to a process for
15 transmitting applications by a transmitting station to
interactive television receivers.

According to the invention, these applications
comprise a startup application and a normal application,
the startup application being intended to cause a test
20 for the presence in a memory of at least one of the
receivers, of at least one file of additional data, as
well as to start up the normal application in the absence
of these files of additional data and to start up an
improved application using these files of additional data
25 if these files are present.

This transmitting process preferably is intended
to implement the interactive television process in
accordance with any one of the forms of the invention.

30   The invention also pertains to a station for
transmitting   programmes   to   interactive   television
receivers. According to the invention, it comprises means
of production and of transmission of at least one message
comprising a startup application and a normal application
35 The startup application is intended to cause a test for

the presence in a memory of at least one of the receivers
of at least one file of additional data, as well as to
start up the normal application in the absence of these
files of additional data and to start up an improved
5   application using the files of additional data if these
files are present.

This transmitting station is preferably intended
to implement the transmitting process according to the
invention.

10   A further subject of the invention is a computer
program product comprising program code instructions for
the execution of the steps of the process according to
any one of the forms of the invention when this program
is executed on a computer. The expression "computer
15   program product" is understood to mean any realization of
a computer program, it may be devised not only for
storage media (cassettes, disks, etc.) but also for
signals (electrical, optical, etc.).

20   The various subjects . characteristic of the
invention will be more clearly apparent .in the
description which follows and in the appended figures
which represent:

- Figure 1, a diagram illustrating the
25   principle of the process of the invention;
- Figures 2a and 2b, flowcharts of an
exemplary use of the process of the
invention;
- Figure 3, an exemplary implementation of the
30   process forming the subject of the
flowcharts of Figures 2a and 2b;
- Figures 4, 5 and 6, examples of information
viewed by the user within the framework of
the process of the invention;

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- Figure 7, a flowchart of another exemplary process according to the invention;
- Figure 8, an exemplary implementation of the process of Figure 7;
5 • Figure 9, a flowchart illustrating a procedure for erasing the additional data in memory of a user terminal;
- Figures 10 and 11, exemplary embodiments of user terminals enabling the invention to be
10 employed.

Referring to Figure 1, the principle of the invention will therefore be described.

A broadcasting station communicates in an interactive manner with one or more digital television
15 user stations, also called reception terminals. Such a terminal must be able to receive, decode and display on a screen content of audiovisual and application package types, and is associated with a storage module allowing the local storage of the content.

20 As is represented in Figure 1, the process provides for the following steps:

Step 1: Transmission by the broadcasting station and execution by the terminal of a first so-called validation application A1, through which it will be
25 possible to validate the loading and the storage of files of additional data;

Step 2: Transmission to the terminal and acquisition by the latter of files of additional data, either by recording of these transmitted files, or by
30 downloading from a server using a return path;

Step 3: Broadcasting and execution of a second so-called startup application A2 and testing for the presence of the files of additional data:

- if the files of additional data are absent,
35 starting up of a normal application A3,

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- if the files of additional data are present,
starting up of an improved version A4 of the application,
using the files of additional data;

Step 4: Execution of the application (normal
5   version A3 or improved version A4);

Step 5: Deletion of the files of additional data
after an expiry date, or upon a particular command from
the user or from the broadcasting station.

Referring to Figures 2a, 2b and 3, a more
10   detailed exemplary use will now be described. According
to this example, the files of additional data contain
data making it possible to carry out in the required time
an improved application, but do not contain the latter
itself.

15   As represented in Figure 2a, the application A1
is broadcast and is loaded into the user terminal. This
application is broadcast during a normal transmission. It
constitutes an interrogation and validation application
destined for the user.

20   By way of illustration, the validation
application A1 is broadcast during a trailer that
presents a forthcoming event. For example, tomorrow
afternoon, the "Tour de France" cycle race will reach
Savoy. On this occasion, the service provider broadcasts
25   the trailer with which an interactive application is
associated, the aim of which is to entice the television
viewer so that he authorizes the loading of the
additional content.

Figure 4 illustrates the interactive application
30   proposed during a trailer relating to the coming
broadcast of a leg of the Tour de France. The screen of
the terminal comprises two zones Z1 and Z2 allowing the
user respectively to register or otherwise his interest
in the application proposed.

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The user will possibly have been informed of the content transfer time, of the possible unavailability of his terminal or of the return path and will optionally be able to choose the means by which he wishes to acquire
5   this content.

He will therefore be able to authorize the storage of additional content on his appliance or on his network. It is this that is indicated in Figure 2a in the form of the question "USER AGREES?".
10   If the user is not interested in the proposed application, and therefore if he does not agree to receive it, the procedure comes to an end. On the other hand, if he does agree, he responds positively and the system prepares itself to send him one or more files of
15 additional data.

Beforehand, but this is not absolutely necessary, the broadcasting station transmits information about the contents of the file of additional data, such as configuration parameters enabling the terminal to
20 download the contents from a URL or to record it (broadcasting service, time of broadcast, etc.), but also the size of the additional data. Depending on this information, the user responds if he agrees to receive the files of additional data. If not, the procedure comes
25 to an end. In the case of a positive response, the system asks the user for the mode of loading that he wants ("MODE OF LOADING?"). Specifically, with the information emanating from the application, the terminal will be able either to download the content from a URL (standing for
30 "Universal Resource Locator") address by virtue of the return path, or to programme a timer to record a broadcast service that will contain the additional content. This additional content may be broadcast at night, or on a service dedicated to the broadcasting of
35 additional content.

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In a preferred deployment, however, the user is not requested a second and a third time after having given his agreement to the storage of additional content, in order to indicate whether he is still in agreement in view of the information regarding the files of additional data. In this variant, the download decision is taken automatically at local level, taking account of the configuration of the terminal and/or of the files acquisition network. This configuration is for example specified beforehand by the user, in the course of a preliminary installation phase.

The file or files of additional data are then stored on a storage facility (hard disk for example) that may be integrated into the appliance, or on an external storage facility.

In the case of external storage, the connection between the terminal and the external storage facility is preferably effected using a standard digital domestic bus with the associated protocols (Firewire and HAVi for example) but may also be effected in a proprietary manner.

A directory in which all the additional content is stored is defined.

As is represented in Figure 2a ("RECORDING IN MEMORY"), the files of additional data are recorded in memory.

Thereafter, a certain time after the broadcasting of the validation application A1 and after a delay sufficient to allow the terminal to finalize the acquisition of the files of additional data, the startup application A2, the normal application A3 and the improved application A4 are broadcast on the terminal (see Figures 2b and 3).

Next, the startup application A2 is executed on the user terminal.

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The presence of the files of additional data is then tested for ("FILES IN MEMORY?").

In the case where the files are not in memory, the system triggers the starting up of the normal
5   application A3.

In the case where the files of additional data are present in full in memory, the system proceeds to the starting up of the improved application A4.

Optionally, the user has the possibility however
10 of in this case choosing the normal application A3 rather than the improved application A4 (see Figure 2b).

Figure 3 represents an exemplary implementation according to which the files of additional data contain
15 only data (video, audio, pictures). The various previous steps are found again in this figure:

1.broadcasting of the validation application A1;

2.broadcasting on request and recording in a memory facility of a user terminal of additional content
20 (files of additional data);

3.broadcasting of the normal application A3 and of the improved application A4 with the startup application A2;

4.starting up of the improved application A4.
25   Figure 5 represents an example corresponding to the message of Figure 4 (selection of zone Z1), of an improved application where the vignette V to the right of the text represents a video sequence. The user can optionally view it in full screen mode by validating
30 through an appropriate actuation.

Figure 6 shows an exemplary normal application also provided for in association with the message of Figure 4 (selection of zone Z2).

Referring to Figures 7 and 8, another exemplary
35 implementation of the process of the invention will now

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be described. In this example, the procedure for
proposing files of additional data to the user and that
he load them into the user terminal is the same as that
which ·was described in conjunction with Figure 2a and
5 will therefore not be described again. On the other hand,
the files of additional data contain the improved
application A4, this not having been the case previously.

As is represented in Figures 7 and 8, the normal
application A3 and the startup application A2 form the
10 subject of a broadcast and of a loading into the user
terminal. As previously, the test in memory for the file
or files of additional data is carried out. If these
files are not in memory, the normal application A3 is
started. If these files are in memory, the improved
15 application A4 contained in the files of additional data
is loaded into an execution memory ("LOADING OF A4") and
then started ("STARTING OF A4") — unless the user
possibly decides to choose the normal application A3.

The possibility should be noted of using a cache
20 to store the normal application A3 broadcast before the
startup application A2.

Moreover, the invention makes provision to delete
the files of additional data from the memory of the user
terminal, thus freeing some room on the storage device
25 and avoiding its saturation.

For this purpose, an expiry data is associated
with each file of additional data, thus allowing the
terminal to delete files whose expiry date has elapsed.
This possibility is indicated in Figures 1, 3 and 8.
30 The deletion from memory of the recorded files of
additional data may also be ordered by the user himself
or remotely by the broadcasting station.

Figure 9 represents a flowchart of a process of
programmed deletion of the files of additional data
35 recorded in the memory of a user terminal.

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During the loading of a file of additional data, an expiry date is associated with this file either by the broadcasting station, or by system, or by the user. This date is recorded in a zone of a memory table together
5 with the address of the corresponding file of additional data. Periodically, the system explores the table, from the first address of this table (i = 0) to the last zone of the table ("LAST ELEMENT?"). With each zone read, the expiry date is compared with the day's date. If it is not
10 greater than the day's date, the system reads the contents of the next . zone by indexing the table ("i = i+1").

If the expiry date is greater than the day's date, the file of additional data is deleted from the
15 memory.

When all the zones have been explored, the system stops.

Figures 10 and 11 represent user terminals making it possible to employ the invention. These devices
20 comprise a central processing unit which is connected to a programme memory and which can receive commands from a remote control interface. The central processing unit manages a screen display device or OSD (standing for On-Screen Display) and an audio/video interface for
25 displaying transmissions on a screen.

In Figure 10, reception is effected by a tuner and by an antenna making it possible to pick up transmissions broadcast over the airwaves, as well as by a modem connected (telephonically for example) to a
30 service provider or to a broadcasting station and linked to the central processing unit. A device for recording additional data makes it possible to store the files of additional data in the user terminal's own memory, called "STORAGE of additional data".

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In Figure 11, a digital network interface of the user terminal is connected by a communication bus to a network tuner, to a network storage device for storing additional data and to a modem.

5   The terminal of Figure 11 forms part of a network of terminals for which the files of additional data are stored in common by means of the network storage device, which comprises for example a recording module and an appropriate storage space. The reception tuner and the

10   modem are also common to the network. The assembly is interconnected by the communication bus. The files of additional data are therefore received and stored by the network storage device by way of the tuner and of the modem.